



HY13-1524-001/US

# Parker Product

Effective: June 2012

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## HTG Transmission Product Series Service Procedure



**WARNING**

FAILURE OR IMPROPER SELECTION OR IMPROPER USE OF THE PRODUCTS AND/OR SYSTEMS DESCRIBED HEREIN OR RELATED ITEMS CAN CAUSE DEATH, PERSONAL INJURY AND PROPERTY DAMAGE.

This document and other information from Parker Hannifin Corporation, its subsidiaries and authorized distributors provide product and/or system options for further investigation by users having technical expertise. It is important that you analyze all aspects of your application and review the information concerning the product or system in the current product catalog. Due to the variety of operating conditions and applications for these products or systems, the user, through its own analysis and testing, is solely responsible for making the final selection of the products and systems and assuring that all performance, safety and warning requirements of the application are met.

The products described herein, including without limitation, product features, specifications, designs, availability and pricing, are subject to change by Parker Hannifin Corporation and its subsidiaries at any time without notice.

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**WARNING** Warning describes hazards or unsafe practices which could result in severe personal injury or death.



**CAUTION** A caution describes hazards or unsafe practices which could result in personal injury or product or property damage.

**NOTE** A note gives key information to make following a procedure easier or quicker.

## Disclaimer

This Service Manual has been prepared by Parker Hannifin Corporation for reference and use by mechanics who have been trained to repair and service hydraulic transmission on commercial and non-commercial equipment applications. Parker Hannifin Corporation has exercised reasonable care and diligence to present accurate, clear and complete information and instructions regarding the techniques and tools required for maintaining, repairing and servicing the Parker HTG Transmission Series. Since this is a general Service Manual, the photographs and illustrations may not look exactly like the transmission being serviced. The procedures, therefore, must be carefully read and understood before servicing.

If inspection or testing reveals evidence of abnormal wear or damage to the HTG Transmission or if you encounter circumstances not covered in the Manual, STOP - CONSULT THE EQUIPMENT MANUFACTURER'S SERVICE MANUAL AND WARRANTY. DO NOT TRY TO REPAIR OR SERVICE A HTG WHICH HAS BEEN DAMAGED OR INCLUDES ANY PART THAT SHOWS EXCESSIVE WEAR UNLESS THE DAMAGED AND WORN PARTS ARE REPLACED WITH ORIGINAL PARKER REPLACEMENT AND SERVICE PARTS AND THE UNIT IS RESTORED TO PARKER SPECIFICATIONS FOR THE HTG.

It is the responsibility of the mechanic performing the maintenance, repairs or service on a particular HTG Transmission to (a) inspect the unit for abnormal wear and damage, (b) choose a repair procedure which will not endanger his/her safety, the safety of others, the equipment or the safe operation of the HTG Transmission, and (c) fully inspect and test the HTG Transmission and the hydraulic system to ensure that the repair or service of the HTG Transmission has been properly performed and that the HTG Transmission and hydraulic system will function properly.

## Conversions

Inches	Mm	Inches	mm
.020	.511	1.060	26.92
.021	.531	1.295	32.89
.029	.741	1.297	32.94
.030	.760	1.396	35.46
.111	2.81	1.398	35.51
.119	3.02	1.620	41.15
.152	3.86	1.622	41.20
.160	4.06	1.983	50.37
.296	7.52	1.985	50.42
.304	7.72	2.120	53.85
.460	11.68	2.122	53.90
.470	11.94	2.233	56.72
.500	12.70	2.235	56.77
.585	14.86	2.483	63.07
.595	15.11	2.485	63.12
.660	16.76	2.500	63.5
.675	17.15	2.88	73.2
1.058	26.87		

## Introduction

The three-column format used in this Service Manual will help make it easy for you to service a HTG transmission. Column 1 illustrates the procedure with photographs, Column 2 gives a brief key for each step, and Column 3 explains in detail the procedure you should follow. Pay special attention to the notes, cautions and warnings.

This manual contains troubleshooting information and checklists. With them you can diagnose a hydraulic system problem without removing the HTG Transmission, the checklists will help you to determine where the problem may be.

Item numbers on the exploded view correspond with item numbers used throughout the Service Manual.

As you gain experience in servicing HTG Transmission, you may find that some information in this Service Manual could be clearer and more complete. If so, let us know about it. Don't try to second-guess the Service Manual; if problems occur that you cannot solve, please contact our service department at 423-639-8151, or your local Parker approved distributor. Servicing HTG Transmission should be safe and productive. Visit our web site at [www.parker.com/pumpmotor](http://www.parker.com/pumpmotor).

## DESIGN FEATURES

### HTG Transmission

- High efficiency results in a cooler running system
- Top housing is sturdy, lightweight aluminum, excellent at dispersing heat, resulting in an overall cooler system
- High capacity thrust bearing provides longer transmission life

### Torqmotor

- Roller vane to reduce friction and internal leakage and to maintain efficiency
- A patented orbiting commutator system for less wear and longer life
- A unique high-pressure shaft seal
- Manifold designed to improve operating efficiency
- Roller vane and sealed commutation assure high volumetric efficiency and smooth low speed operation

## Troubleshooting Guide

### NOTE

Before troubleshooting any system problem, check service literature published by the equipment and/or component manufacturers. Follow their instructions, if given, for checking any component other than the HTG Transmission.

### Preparation

Make your troubleshooting easier by preparing as follows:

- work in a clean, well-lighted place
- have proper tools and materials nearby
- have an air pressure source.

### WARNING

Since solvents are flammable, be extremely careful when using any solvent. Even a small explosion could cause injury or death.

### WARNING

Wear eye protection and be sure to comply with OSHA and other maximum air pressure requirements. Keep hands clear of fan and moving parts can cause personal injury. Shut off engine and let entire system cool before removing any component.

### Preliminary Checks

Hydraulic systems are often trouble-free. Hence, the problem an operator complains of could be caused by something other than the hydraulic components.

Thus, once you have determined that a problem exists, start with the easy-to-check items, such as:

- Parts damaged from impact that were not properly repaired, or that should have been replaced
- Improper replacement parts used in previous servicing
- Mechanical linkage problems such as binding, broken or loose parts, or slipping belts

### Hydraulic Components

If you think the problem is caused by a hydraulic component, start by checking the easy-to-reach items.

Check all belts for cracks, hardening or other signs of wear. Check all pulleys, fans and bolts to make sure they are tightened to specified torque value. Look for leaks, especially at coupling shaft and plugs.

If necessary replace filter. Always replace with original Parker filter. Torque to 115 – 135 in. lbs.

Visually check other components to see if they are loosely mounted, show signs of leaks, or indicate by other damage or wear.

### Suspect Faulty Transmission

Before the transmission is disassembled for repair, make sure all control arm adjustments and engine speed requirements are per OEM specification. Also make sure the parking brake is releasing fully on both sides.

If there is a defect in the transmission, a right to left side performance difference should be noticeable. To test for this condition, run the vehicle at full forward throttle and control levers. The vehicle should track nearly straight both on flat ground and on uphill grades.

## Troubleshooting Checklist

Trouble	Cause	Remedy
<b>Fluid Leakage</b>	1. Fitting loose, worn or damaged	Check & replace damaged gasket or "O" rings. Torque to manufacturers specifications
	2. Seals deteriorated by excess heat	Replace seals by disassembling unit
<b>Operates Hot</b>	1. Debris buildup	Remove debris
	2. Cooling fan damaged	Replace fan
	3. Oil level low or contaminated	Either fill to proper oil level or change filter refill with new oil
	4. Excessive loading	Reduce vehicle load
	5. Air trapped in system	Run vehicle slowly forward and then reverse several times
<b>No or Low Power</b>	1. Oil level low or contaminated	Either fill to proper oil level or change filter and refill with new oil
	2. Bypass valve open	Turn to closed position
	3. Excessive loading	Reduce vehicle load
	4. Engine speed low	Adjust engine speed to correct value
	5. Air trapped in system	Run vehicle slowly forward and then reverse several times
	6. Suspect internal component damage	Disassemble and inspect
	7. Pulley or belt loose	Tighten to specifications
<b>Noisy Unit</b>	1. Oil level low or contaminated	Either fill to proper oil level or change filter and refill with new oil
	2. Excessive loading	Reduce vehicle load
	3. Excessive speed input	Adjust input speed above 1800 rpm and below 3600 rpm
	4. Air trapped in system	Run vehicle slowly forward and then reverse several times
	5. Bypass valve open	Turn to closed position

## Tools and Materials Required for Servicing

- Clean, petroleum-based solvent
- To insure maximum transmission performance and life, use a Parker recommended fluid and filter change schedule.  
At 300 hour break-in period change the oil and filter. Subsequent oil and filter change intervals depend on the type of oil used. Always change the filter when changing the oil.

### Qualified Oils

Parker GT Blend	1000 hour
Castrol Syntec 5W50	500 hour
Amsoil AW ISO 68	500 hour
Shell TTF-SB	500 hour
Other*	250 hour

Must be premium grade synthetic based engine oil with a minimum viscosity grade of 15W40.

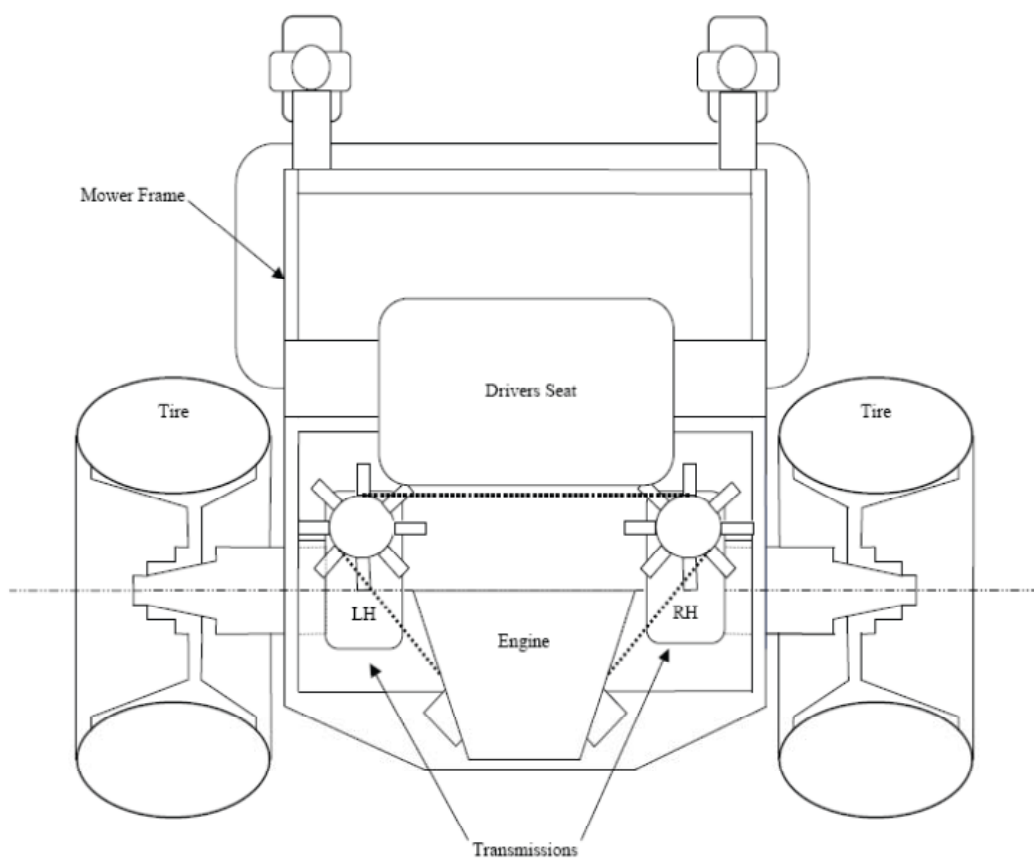
- Emery paper
- Vise with soft jaws
- Rubber mallet
- Air-pressure source
- Arbor press
- Flat screwdriver
- Grease pencil or paint pen
- Small gear puller
- 1/4" torque wrench : 270-300 in-lbs, 100-120 in-lbs, 200-240 in-lbs, 50-70 ft-lbs, 350-400 ft-lbs, 45-55 ft-lbs
- Sockets: 3/8" drive ratchet, 5/16", 15/16", 9/16", T30 Torx Bit, 13mm
- Vise grip™ pliers
- Internal snap ring pliers
- Clean corrosion resistant grease. Recommended grease is Mobil Mobilith SHC® 460 or equivalent.



### **CAUTION**

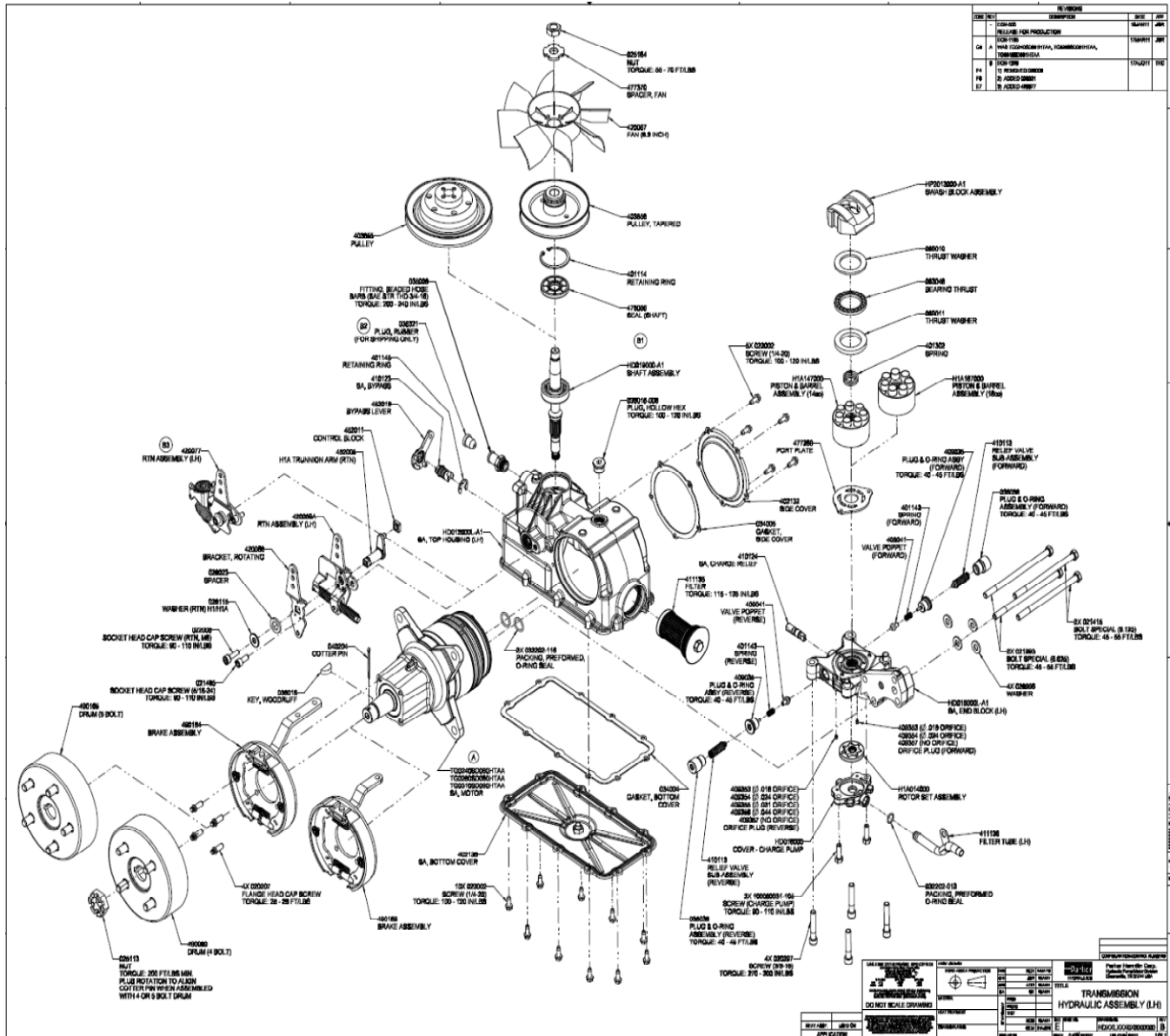
Mixing greases that have different bases can be detrimental to bearing life.





**Rear of Mower**

## Left Hand





SK000275 PARTS LIST – FAN KIT			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	025164	NUT
2	1	477370	FAN SPACER
3	1	420067	FAN (8.3 INCH)
	1	SK000275 SHEET 3	SERVICE BULLETIN
SK000276 PARTS LIST - MOTOR KIT (240cc- Right Hand Side)			
	QTY	PART NUMBER	DESCRIPTION
1	1	TG0240SD081HTAA	
2	2	032202-116	O-RING
3	1	034005	SIDE COVER GASKET
	1	SK000276 SHEET 3	SERVICE BULLETIN
SK000277 PARTS LIST - MOTOR KIT (280cc - Right Hand Side)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TG0280SD081HTAA	
2	2	032202-116	O-RING
3	1	034005	SIDE COVER GASKET
	1	SK000277 SHEET 3	SERVICE BULLETIN
SK000278 PARTS LIST - MOTOR KIT (310cc - Right Hand Side)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TG0310SD081HTAA	
2	2	032202-116	O-RING
3	1	034005	SIDE COVER GASKET
	1	SK000278 SHEET 3	SERVICE BULLETIN
SK000279 PARTS LIST - MOTOR KIT (240cc - Left Hand Side)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TG0240SD080HTAA	
2	2	032202-116	O-RING
3	1	034005	SIDE COVER GASKET
	1	SK000279 SHEET 3	SERVICE BULLETIN

SK000280 PARTS LIST - MOTOR KIT (280cc - Left Hand Side)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TG0280SD080HTAA	
2	2	032202-116	O-RING
3	1	034005	SIDE COVER GASKET
	1	SK000280 SHEET 3	SERVICE BULLETIN
SK000281 PARTS LIST - MOTOR KIT (310 cc - Left Hand Side)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	TG0310SD080HTAA	
2	2	032202-116	O-RING
3	1	034005	SIDE COVER GASKET
	1	Sk000281 SHEET 3	SERVICE BULLETIN
SK000282 PARTS LIST - MOTOR KIT (Brake Kit - 5 Bolt / 2 Hole Lever)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	040204	COTTER PIN
2	1	490164	BRAKE SHOE ASSEMBLY WITH TWO HOLE LEVER ARM
3	1	490165	5 BOLT BRAKE DRUM
4	4	020207	5/16-18 FLANGE HEAD CAP SCREWS
5	1	025113	1-20 SLOTTED NUT
	1	SK000282 SHEET 3	SERVICE BULLETIN
SK000283 PARTS LIST - MOTOR KIT (Brake Kit - 4 Bolt / 2 Hole Lever)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	040204	COTTER PIN
2	1	490164	BRAKE SHOE ASSEMBLY WITH TWO HOLE LEVER ARM
3	1	490080	4 BOLT BRAKE DRUM
4	4	020207	5/16-18 FLANGE HEAD CAP SCREWS
5	1	025113	1-20 SLOTTED NUT
	1	SK000283 SHEET 3	SERVICE BULLETIN

SK000284 PARTS LIST - MOTOR KIT (Break Kit - 5 Bolt / 1 Hole Lever)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	040204	COTTER PIN
2	1	490169	BRAKE SHOE ASSEMBLY WITH ONE HOLE LEVER ARM
3	1	490165	5 BOLT BRAKE DRUM
4	4	020207	5/16-18 FLANGE HEAD CAP SCREWS
5	1	025113	1-20 SLOTTED NUT
	1	SK000284 SHEET 3	SERVICE BULLETIN
SK000285 PARTS LIST - MOTOR KIT (Brake Kit - 4 Bolt / 1 Hole Lever)			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	040204	COTTER PIN
2	1	490169	BRAKE SHOE ASSEMBLY WITH ONE HOLE LEVER ARM
3	1	490080	4 BOLT BRAKE DRUM
4	4	020207	5/16-18 FLANGE HEAD CAP SCREWS
5	1	025113	1-20 SLOTTED NUT
	1	SK000285 SHEET 3	SERVICE BULLETIN
SK000287 PARTS LIST - SECTION SEAL KIT			
ITEM	QTY	PART NUMBER	DESCRIPTION
1	1	401114	RETAINING RING
2	1	478086	DIRT AND WATER SEAL
3	1	028008	SEAL WASHER
4	2	032202-116	O-RING SEAL
5	1	034005	SIDE COVER GASKET
6	1	034004	BOTTOM COVER GASKET
7	2	032206-018	O-RING SEAL
8	1	032203-114	O-RING SEAL
	1	SK000287 SHEET 3	SERVICE BULLETIN

SK000288		PART LIST - MOTOR SEAL KIT	
1	1	478035	DIRT AND WATER SEAL
2	1	028515	BACKUP RING
3	1	029118	BACKUP WASHER
4	1	032818	SHAFT SEAL
5	3	032820	VITON SECTION O-RING
6	2	032862	SECTION O-RING
7	1	032861	SEAL RING
8	1	032202-244	OD END COVER O-RING SEAL
9	2	032202-116	MOTOR TO ENDBLOCK O-RING SEALS
10	1	034005	SIDE COVER GASKET
	1	Sk000288 SHEETS 3-5	SERVICE BULLETIN

Before you disassemble the HTG Transmission or any of its components, read this entire manual. It provides important information on parts and procedures you will need to know to service the HTG Transmission unit. Be sure that you know and understand the equipment and any hazards associated with performing these procedures.

Thoroughly clean off all outside dirt and grass, especially from around fittings and hose connections before disconnecting and removing the HTG Transmission. Remove rust or corrosion from the coupling shaft.

Remove belt connections immediately plug port holes and any fluid lines.

Depends on how the HTG is mounted to vehicle if the nut, brake hub and brake back plate needs to be removed prior to the HTG removal for inspection and or repair. It is recommended by the factory to remove these items prior to HTG as a safer practice. Refer to page 10 and 11 illustrations for removal and replace of the brake assembly and torque specifications.

Remove the HTG Transmission from the system, drain it of fluid and take it to a clean work surface.

Remove fan from shaft prior to servicing any portion of transmission to prevent from breaking.

Clean and dry the HTG Transmission before you start to disassemble it.

As you disassemble the HTG Transmission, clean all parts, except seals, in clean, OSHA approved solvent, and use low pressure air to blow them dry.

**WARNING**

Since they are oil and grease that can be flammable be extremely careful when using any solvent. Even a small explosion or fire could cause injury or death.

**WARNING**

Wear eye protection and be sure to comply with OSHA and other maximum air pressure requirements.

**WARNING**

Never steam or use high pressure to wash hydraulic components. Do not force or abuse closely fitted parts.

**WARNING**





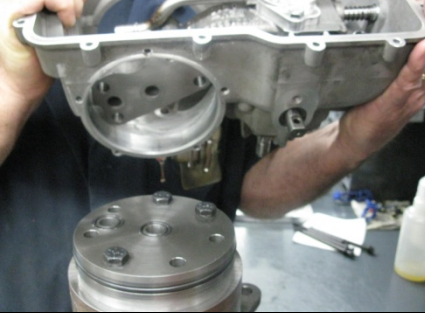
Never attempt to tow, push or pull equipment with another vehicle. Towing will cause hydraulic transmission further damage. If equipment needs to be moved make sure both transmission bypass valves are open and hand push.

Keep parts separate to avoid nicks and burrs.

Discard all seals and seal rings as they are removed from the HTG Transmission unit. Replace all seal rings and any damaged or worn parts with genuine Parker Hannifin Corporation or OEM approved service parts.





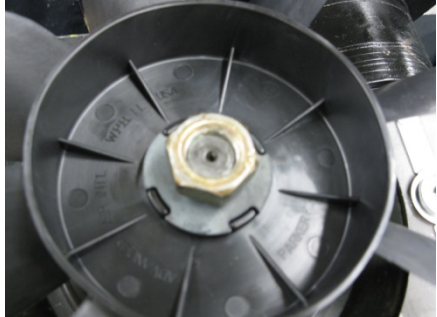


	<b>Remove Transmission unit from vehicle</b>	Either plug the expansion tube fitting or place tape over the end of the expansion tube fitting to keep oil from leaking out. Clean unit free of grass and other debris; let dry and place on a clean working table.
	<b>NOTE: If exchanging the hydraulic motor only follow these next seventeen steps:</b>  <b>If a complete tear down is needed please go to FIG II on page 20</b>	Place an oil pan for oil collection under the unit. Remove filter from unit drain oil.
	<b>Remove side cover</b>	Remove the five screws from the side cover and remove cover.
	<b>Remove gasket</b>	Remove gasket inspect for any damage replace if needed.
	<b>Loosen and remove four bolts</b>	Notice that two of the four bolts are longer these have to be returned in the same position.





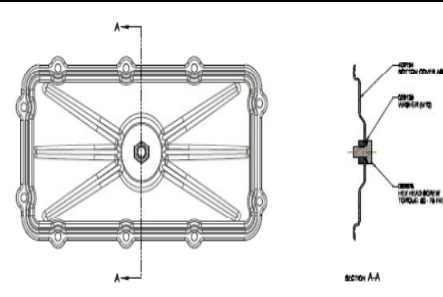
	<b>Remove top housing from motor end cover</b>	Remove top housing and set aside.
	<b>Remove the entire motor assembly</b>	Remove the entire motor out from the top housing.
	<b>Replace O ring</b>	After you remove the motor the filter tube will be free to remove and replace O ring.
	<b>Installing new motor</b>	Place the two O rings on the end cover and outside cover O ring onto the new motor.
	<b>Install top housing onto motor end cover</b>	With the motor housing in a soft jaw vice install the top housing onto motor end cover. Align these two components together pressing down on top housing to secure the end cover.

	<b>Place the charge pump pick up tube to the correct bolt position replace torque bolts</b>	Push the charge pump tube O ring inside of charge pump cover. Notice that two of the bolts are longer than other two. Torque each bolt to 45 – 55 ft. lbs.
	<b>Install side cover gasket</b>	Place the side cover gasket on top of housing align to screw holes.
	<b>Install side cover screws torque to specifications.</b>	Place side cover on top of gasket. Start each five self tapping screws half way down. Starting at one of the ¼--20 screws torque to 100 – 200 in. lbs. repeat process by going diagonal to the next screw.
	<b>Install new filter</b>	Hand start the filter into threads of top housing. Using a socket and torque wrench torque the filter to 115 -135 in. lbs. Fill transmission with Parker recommended oil 96 oz.
	<b>Fill transmission with Parker recommended oil</b>	To insure maximum performance and life, use a Parker recommended fluid listed on page 8.








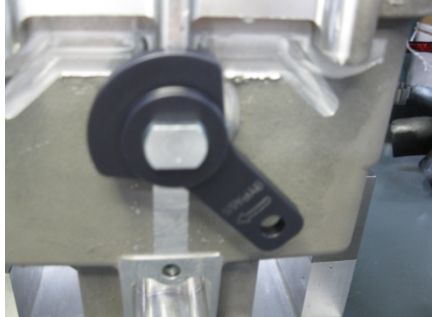




	<b>Replace plug</b>	Hand start hollow hex plug
	<b>Torque Hollow Hex Plug</b>	Torque to 100 – 120 in. lbs.
	<b>FIG II Remove the fluid filter to completely drain unit</b>	Place a pan for fluid collection under the unit. Remove the filter from the unit allowing the fluid to drain into the pan.
	<b>Drain oil out of unit</b>	To help drain fluid either remove tape or fitting to act as a vent.
	<b>Remove fan nut</b>	With a 15/16" socket remove the fan / pulley nut. Inspect nut for any thread or other damage. If none exits nut can be reused. Apply Loctite <sup>™</sup> 242 to threads of nut if to be reused.

	<b>Remove four tab washer</b>	
	<b>Remove the fan</b>	Check for any damage due to normal wear. If none exist fan can be reused.
	<b>Remove pulley</b>   <b>CAUTION: Use caution not to bend or damage pulley</b>	May require using (Posi Lock Model 204) puller or a bearing puller to take off pulley.
	<b>Remove RTN assembly if equipped</b>	Use a 1/4" allen wrench to remove both allen head screws.
	<b>Remove side cover</b>	Remove the five screws from the side plate and remove plate.


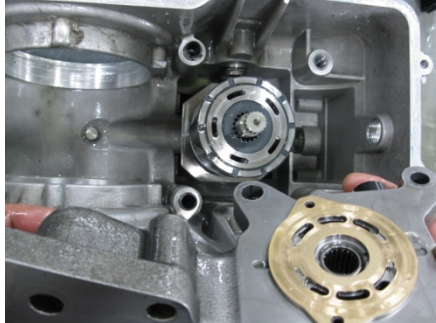



	<b>Remove gasket</b>	Remove gasket inspect for any damage replace if needed.
	<b>Loosen and remove four bolts</b>	
	<b>Remove the entire motor assembly</b>	Remove the entire motor out from the top housing.
	<b>Remove bottom cover</b>	Remove the ten (1/4-20) screws from bottom cover.
	<b>Plug and washer</b>	If plug was removed to drain the oil inspect the washer between pan and plug. Replace washer if necessary. Torque plug to 50-75 in lbs.


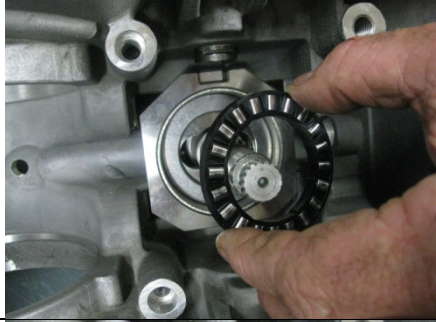

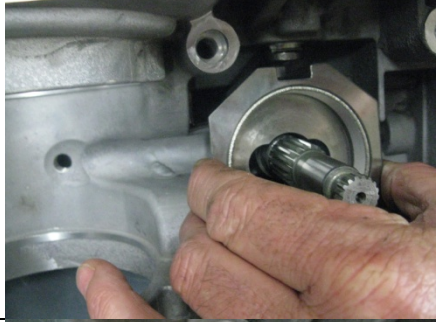



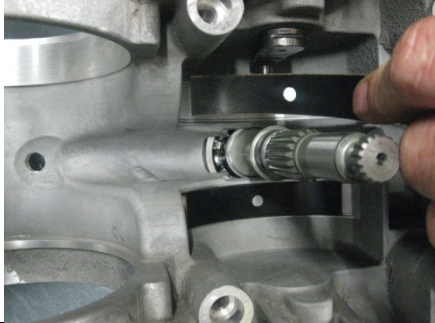

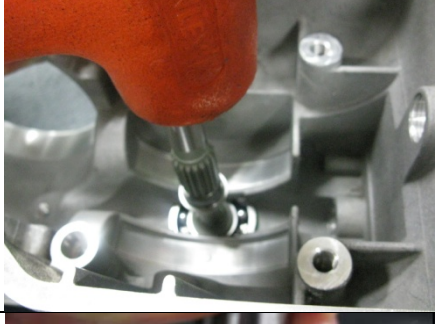


	<b>Remove charge pump pick up tube and O-ring</b>	Careful not to bend tube. Check O ring for any damage replace if needed.
	<b>Remove two charge pump cover bolts</b>	
	<b>Remove charge pump cover</b>	Remove and inspect the inside of charge pump cover for any scoring replace if necessary.
	<b>Remove charge pump rotor set</b>	Remove both the charge pump rotor and stator. Inspect for any damage either on the tips of rotor or stator lobes. Replace if necessary.
	<b>Remove bypass valve clip</b>	Using a flat head screw driver push clip upward to release.

	<b>Remove bypass lever</b>	Pull bypass lever away from stem.
	<b>Remove bypass</b>	Pull bypass out of top housing.
	<b>Remove four end block screws</b>	Remove the four end block screws notice that two of four bolts are longer than the other. Inspect the threads on each bolt.
	<b>Remove end block</b>  <b>Caution: While taking out end block may require holding down on the barrel to separate from port plate</b>	Take out the entire end block. Notice port plate may stick to end block face.
	<b>Remove valve cap</b>	Remove valve cap from end block.









	<p><b>Remove spring and shock valve</b></p> <p><b>NOTE: Keep the shock valve in the same port as removed.</b></p>	<p>Turn end block to side and remove spring and shock valve. Repeat other side keeping the shock valves tagged it is important to keep these two valves in the same hole location.</p>
	<p><b>Remove port plate and inspect</b></p> <p><b>Note brass side of port plate faces rotating group</b></p>	<p>Inspect for any damage to the port plate. If the brass side of port plate has heavy scoring on face replace with new port plate.</p>
	<p><b>Remove rotating group with pistons</b></p>	<p>Place your fingers around each piston to ensure they do not fall out of barrel. Pistons have to stay in original location of the barrel.</p>
	<p><b>Inspect each piston one at a time to keep original piston and spring to barrel position</b></p>	<p>Check surface of rotation group and sides of pistons for excessive wear, indicated by scoring or scratch marks. Remove pistons, springs check bores for signs of scoring.</p>
	<p><b>Remove central spring</b></p>	




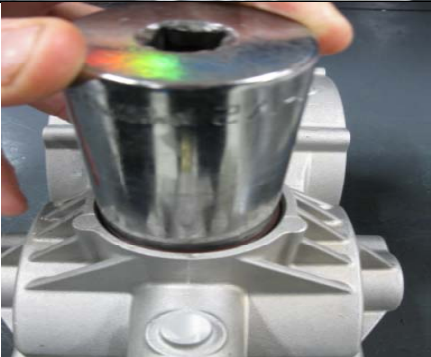
	<b>Remove top washer (.250" thick)</b>	Remove top washer inspect for any pitting or galling to either side of top washer.
	<b>Remove thrust bearing</b>	Remove thrust bearing inspect bearing rollers for any signs of pitting or galling to rollers.
	<b>Remove bottom washer (.125" thick)</b>	Remove and inspect bottom thrust washer for any pitting and galling of either side of washer.
	<b>Remove swash block</b>	Remove swash block. Inspect top and bottom surfaces for excessive wear.
	<b>Remove control block</b>	Remove the square control block.




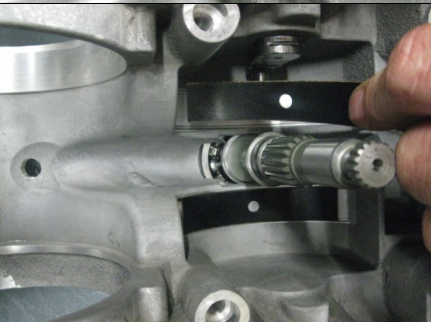
	<b>Remove both cradle bushings</b>	Remove and inspect both cradle bushings for excessive wear, pitting or scoring. Light visual wear of coating is allowed.
	<b>Remove shaft seal snap ring</b>	With internal snap ring pliers remove snap ring.
	<b>Remove pump shaft and bearing assembly</b>	Tap top of shaft with a rubber mallet to loosen. Keep assembly as level as possible not to damage shaft and housing.
	<b>Shaft and bearing assembly</b>	When shaft is free from housing assembly shaft seal will also be removed.
	<b>Remove trunnion arm</b>	Push trunnion arm in and remove.




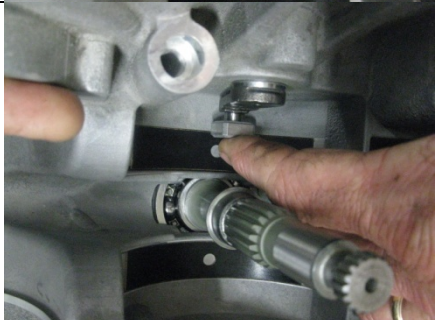



	<b>Remove trunnion arm seal</b>	If necessary, remove trunnion arm seal. Position the flat edge of screw driver under the lip of seal and lift outward.
<b>NOTE:</b> Make sure not to score the edges of housing while removing trunnion arm seal.		

	<b>Install trunnion arm seal</b>	Starting with the top housing polish out any burrs if needed with emery paper. Clean seal area with a lint free cloth.
	<b>To assist alignment of seal install trunnion arm</b>	
	<b>Place trunnion seal over arm</b>	Lightly apply synthetic oil to trunnion arm seal slide over the trunnion arm with the seal lip towards housing.
	<b>Seat trunnion arm seal</b>	With a 5/8" deep well socket gently tap socket with rubber hammer driving seal into place.
	<b>Trunnion arm seal</b>	Trunnion seal should be below top housing face.


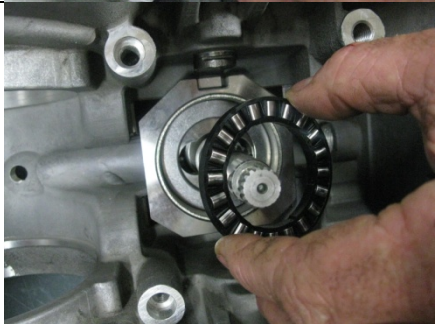
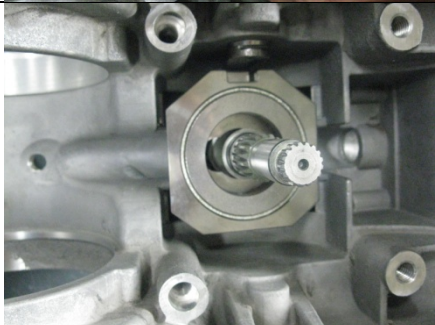
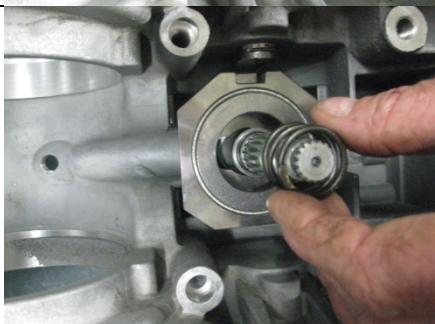

	<b>Install pump shaft and bearing assembly into top housing</b>	Place the extended shaft through hole.
	<b>Seat shaft bearing to bottom of top housing</b>	Push shaft and bearing assembly to the bottom of the top housing.
	<b>Install pump seal</b>	Place seal over output shaft avoid any sharp edges while installing seal over the pump shaft.
	<b>Aid of socket</b>	Place socket on top of charge pump seal.






	<b>Seat charge pump seal</b>	Lightly tap socket with a rubber mallet until seal is below snap ring groove.
	<b>Install snap ring</b>	Use internal snap ring pliers and insert snap ring into groove of top housing.
	<b>Install the two cradle bushing</b>	Place each cradle bushing pin hole to inner top housing pin.  Do not stake pins.
	<b>Both cradle bushing in place</b>	Apply synthetic oil on top of each cradle bushing.








	<b>Trunnion arm</b>	Push the trunnion flush to inner top housing.
	<b>Install control block</b>	Install control block onto trunnion arm inside of top housing.
	<b>Install swash block</b>	Install swash block subassembly onto cradle bearings in top housing. Align swash block with control block using a small screwdriver.
	<b>Align swash block to the control block</b>	Verify that swash block moves freely back and forth on bushing without binding or dragging.
	<b>Apply oil into swash block</b>	Apply synthetic oil prior to installing thin washer into swash block.



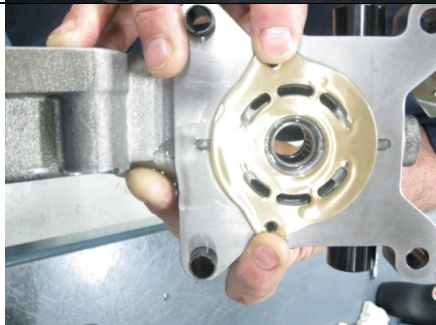




	<b>Install thrust washer</b>	Install thin (.125") thrust washer into swash block.
	<b>Install thrust bearing</b>	Install thrust bearing on top of thrust washer.
	<b>Install top washer</b>	Install thick (.250") thrust washer into swash block. Apply synthetic oil to the top washer.
	<b>Central spring</b>	Place central spring onto pump shaft.
	<b>Rotating group assembly</b>	By holding all pistons tight in place turn upside down and position pistons towards top of thrust washer.






	<b>Install rotating group over the charge pump shaft</b>	Flip rotating group over and onto thrust washer. Do not release pistons until properly seated onto top washer. Press barrel down to feel piston and springs are compressing freely.
	<b>Oil top of barrel assembly</b>	Apply synthetic oil to top of barrel assembly face
	<b>End Block</b>	Prepare end block for sub assembly.  Inspect face of end block to ensure no scratches are in-between kidney ports and dowel pins are in place.
	<b>Install shock valve and spring</b>  <b>NOTE: Keep the shock valve in the same port as removed.</b>	Turn end block to side insert the shock valve bullet noise first with the spring on the back side of shock valve.
	<b>Install valve cap</b>	Capture the spring into the valve cap hand start threads into end block assembly.

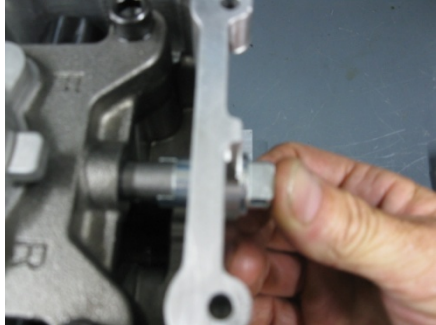




	<b>Repeat shock valve installation opposite side</b>	
	<b>Install shock valve and spring</b>	Turn end block to side and insert the shock valve bullet nose first with the spring on the back side of shock valve.
	<b>Install valve cap</b>	Capture the spring into the valve cap hand start threads into end block assembly.
	<b>Torque valve cap</b>	Torque both caps to 40 – 45 ft. lbs.
	<b>Make sure end block is free of any debris apply oil to face of end block</b>	Apply synthetic oil on the face of end block. Oil will allow the port plate to stick to the end block




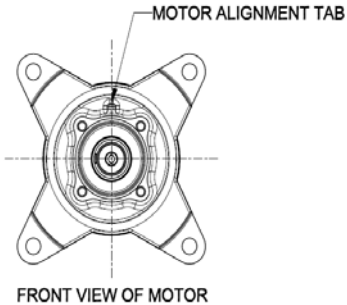
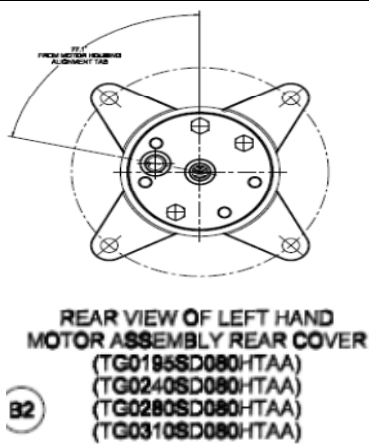
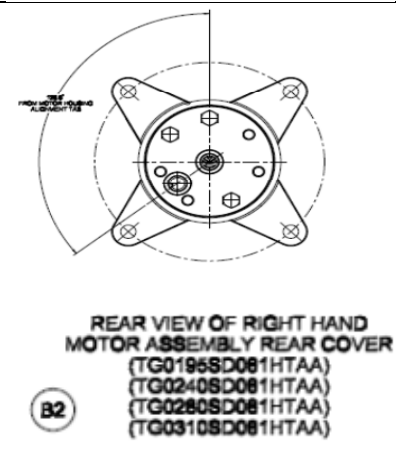
	<b>Port plate</b>	Place the port plate onto the end block assemble bronze side facing up. Align port plate to both dowel pins.
	<b>Apply Oil onto port plate</b>	Apply synthetic oil on face of port plate spread over the entire plate.
	<b>Placing end block into top housing</b>	While holding the port plate in place turn the end block over and place into proper area in the top housing.
	<b>Align end block to bolt holes</b>	Handle careful not to damage splines of charge pump shaft and port plate stays in position.
	<b>End block aligned to top housing</b>	

	<b>Insert and hand start four bolts</b>	Insert four bolts 3/8-16 X 2"
	<b>Torque each bolt</b>	Torque each (3/8-16) bolt by going diagonal to 550 - 660 in. lbs.
	<b>Apply oil to face of endblock</b>	Apply a small amount of synthetic oil to the face of the end block.
	<b>Install rotor</b>	Place the rotor onto pump shaft splines.
	<b>Install stator</b>	Place the outside stator onto face of end block.


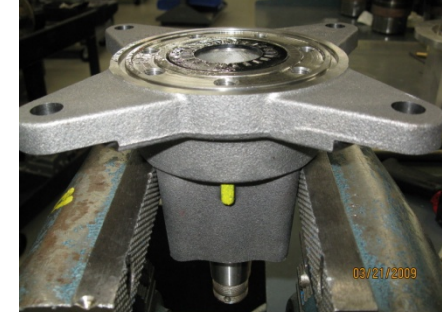



	<b>Charge pump cover</b>	Place the charge pump cover over the charge pump rotor and stator.
	<b>Align bolt holes to end block</b>	Align the charge pump cover holes to the end block.
	<b>Start two bolts</b>	Hand start the two bolts of the charge pump cover to end block.
	<b>Torque bolts</b>	Torque both bolts by going diagonal to 90 - 110 in. lbs.
	<b>Bypass relief valve</b>	Place bypass relief valve into end block.






	<b>Bypass stem</b>	Place the bypass stem into top housing hole and align with bypass valve.
	<b>Bypass valve clip assembly</b>	Push the retaining clip on stem of bypass valve groove.
	<b>Bypass lever</b>	Place the bypass lever into slot of the valve push until lever arm snaps into place. Position lever arm to closed bypass valve.
	<b>Charge pump pick up tube</b>	Place O-ring onto the end of charge pump pick up tube. Lightly oil the O-ring with synthetic oil.
	<b>Install tube into charge pump cover</b>	Push the charge pump tube inside of charge pump cover.





		<p>Be sure the O-ring does not get pinched and goes up inside of receiver stem of charge pump cover.</p>
 <p>FRONT VIEW OF MOTOR</p>	<p>Notice alignment tab on housing this is used to align or clock the end cover per model code.</p>	
 <p>REAR VIEW OF LEFT HAND  MOTOR ASSEMBLY REAR COVER  (TG0195SD080HTAA)  (TG0240SD080HTAA)  (TG0280SD080HTAA)  (TG0310SD080HTAA)</p> <p>B2</p>	<p>View of picture alignment tab is at 12:00 o'clock position.</p>	
 <p>REAR VIEW OF RIGHT HAND  MOTOR ASSEMBLY REAR COVER  (TG0195SD081HTAA)  (TG0240SD081HTAA)  (TG0280SD081HTAA)  (TG0310SD081HTAA)</p> <p>B2</p>	<p>View of picture alignment tab is at 12:00 o'clock position.</p>	













	<p><b>Motor Assembly</b></p> <p><b>Place motor housing in soft jawed vise</b></p>	<p>Place front of housing nose pointed down and the vise jaws clamping firmly on the sides of the housing.</p>
	<p><b>Warning: If the torqmotor is not firmly held in the vise, it could be dislodged during the service procedures, causing injury.</b></p>	<p>Notice alignment tab on housing this is used to align or clock the end cover per model code.</p>
		<p>With a clean housing pull the two thrust washers with the bearing in the middle up on edge as shown in picture.</p>
	<p><b>Back up ring</b></p> <p><b>Housing requires assembling a new back up ring, back up washer and new shaft seal.</b></p>	<p>Place the thicker back up washer either side down into housing past the washer bearing package. Back up washer will lay flat into groove of housing seal cavity.</p>
	<p><b>Back up washer</b></p>	<p>Next put the thin flat washer either side down into housing laying on top of the back up ring.</p>






	<b>Install shaft seal</b>	Place the flat side of shaft seal towards the flat washer and the lip of seal towards end cover. Use your fingers press shaft seal firmly into housing seal groove until it makes contact to flat washer.
	<b>Lay the washer bearing package flat</b>	Make sure the thrust bearing stays in the middle of the two washers. Lay the washer bearing package flat to housing face.
	<b>Apply oil on the shaft</b>	Apply synthetic oil to help shaft passing through lip of shaft seal package.
	<b>Insert shaft into housing</b>	Slightly rotate shaft while pushing down so that it passes through seal package and bottoms out to the top thrust washer.
	<b>Top of output shaft</b>	Top of the shaft should be even with the radial bearing face.

	<b>Install thrust bearing</b>	Install thrust bearing onto the end of coupling shaft.
	<b>Install drive link</b>	Install drive link long splined end down into the coupling shaft. Engage drive link splines until they mesh with the internal coupling shaft splines.
	<b>Install housing face o-ring</b>	Apply small amount of clean grease to a new section seal ring and assemble it into the seal ring groove of the housing face.
	<b>Assemble wear plate</b>	Place wear plate over drive link.
	<b>Alignment of wear plate to housing bolt holes</b>	Align wear plate holes to the housing bolt holes.

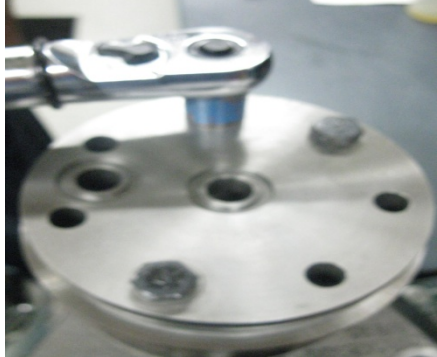








	<b>Assemble seal ring</b>	Apply small amount of clean grease to new seal ring and assemble it into the seal ring groove of the rotor set.
	<b>Install the assembled rotor set</b> <b>Note: Rotor counterbore side must be down against wear plate for drive link clearance and to maintain the rotor-drive link spline contact.</b>	Install the assembled rotor set with rotor counterbore and seal ring side facing down onto wear plate.
	<b>Alignment of rotor set to housing bolt holes</b>	Turn the assembly so that the holes match up with the bolt holes of housing.
	<b>Install rotor thrust washer</b>	Place thrust washer on the tip of drive link and into groove of rotor.
	<b>Washer installed</b>	Washer will fit flush to top of rotor.

	<p><b>Assemble square cut seal ring in manifold</b></p> <p>The manifold is made up of several plates bonded together permanently to form an integral component.</p>	<p>Apply clean grease to a new square cut seal ring and assemble it in the seal ring groove of rotor set side of the manifold.</p>
	<p>The manifold surface that must contact the rotor set has a series of irregular shaped cavities on the largest circumference and circle around the inside diameter.</p>	<p>Face shown goes towards the rotor set.</p>
	<p><b>Assemble manifold</b></p>	<p>Assemble the manifold over the drive link and onto the rotor set.  Face shown towards commutator set.</p>
	<p><b>Assemble O-ring seal</b></p>	<p>Apply clean grease to a new seal ring and assemble it in the seal ring groove of manifold top side.</p>
	<p><b>Assemble seal and commutator</b></p>	<p>Assemble new seal ring flat side up into commutator. Notice commutator seal is formed in a "V" shape the flat side faces towards end cover.</p>



	<b>Place commutator over drive link onto manifold</b>	Place commutator over the end of drive link onto manifold with the seal ring face side up.
	<b>Assemble commutator ring</b>  <b>The commutator and commutator ring are a matched set</b>	Place commutator ring on top of manifold and align the holes up with the bolt holes of housing.
	<b>Assemble seal ring and end cover</b>	Apply clean grease to a new seal ring and assemble it in the seal ring groove of end cover.
	<b>Install the three end cover bolts</b>	Picture shown is for a reverse time (RH) motor.
	<b>Install the three end cover bolts</b>	Picture shown is for a standard timed (LH) motor.













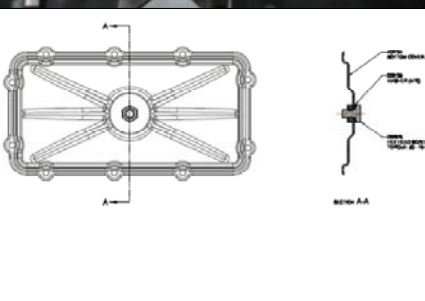
	<b>Torque bolts to specifications</b>	
	<b>Install both end cover O-rings</b>	Apply clean grease onto each O-ring and place in the groove area of the end cover.
	<b>End cover O-ring</b>	Place O-ring over the end cover and into groove.
	<b>Install top housing onto motor end cover</b>	With the motor still in the vise place the top housing assembly onto the end cover of the motor.
	<b>Align the top housing to the two O-rings in the end cover</b>	Align these two components together pressing down on the top housing to secure the end cover O-ring fits inside of top housing cavity.

	<b>Place flat washer under head of each bolt</b>	Starting with two bolts measuring 6.125" place washer under head of each bolt.
	<b>Refer to picture for bolt location</b>	Hand start each bolt to ensure you do not cross thread. Refer to picture for location of bolt.
		Repeat step for the second bolt that measures 6.125" long.
	<b>Refer to picture for bolt location</b>	Place washer on the two remaining bolts that measure 6.625" long.
		Hand start each bolt to ensure you do not cross thread. Refer to picture for location of bolt.







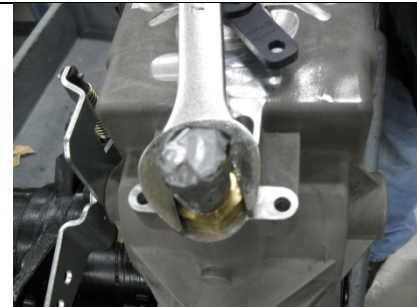




	<b>Torque each bolt to specification</b>	Torque each bolt to 45-55 ft. lbs. by going diagonal from each bolt.
	<b>Install side cover gasket</b>	Place the side cover gasket on top housing.
	<b>Install side cover</b>	Place the side cover on top of gasket and align the screw holes.
	<b>Install side cover screws</b>	Start one of the self tapping screws half way down.
	<b>Install side cover screws</b>	Start the second self tapping screw again only half way down.

	<b>Install side cover screws</b>	Repeat process until each screw has been started half way down.
	<b>Torque side cover screws</b>  <b>Side cover is marked in order how each screw is torque.</b>	Starting at one of the (1/4-20) screws torque to 100 – 120 in. lbs. repeat process by following the marked number on the side cover plate.
	<b>Install filter</b>	Hand start the filter into the top housing hand tight.
	<b>Torque filter</b>   <b>CAUTION</b> <b>Do not over torque</b>	Using a socket and torque wrench torque the filter to 115 -135 in. lbs. Use caution do not over torque causing hex plug damage.
	<b>Install bottom gasket</b>  <b>Aid of alignment pins</b>	Place the bottom gasket according to bolt pattern.  If available use three alignment roll pins that fit the screw holes to help keep the gasket from moving out of place.

	<b>Install bottom cover</b>	Place the bottom cover over gasket. Use alignment pins to keep cover from shifting.
	<b>Start self tapping screws</b>	Start one of the self tapping screws half way down.
	<b>Start each one of the self tapping screws</b>	Repeat process until each screw has been started half way down. Take out the alignment pins and replace with screw.
	<b>Torque bottom screws</b>  <b>Bottom cover is marked in order how each screw is torque.</b>	Starting at the number one screw torque to 100 – 120 in. lbs. repeat by following the marked number on the bottom cover until all screws have been properly torque.
	<b>Plug and washer</b>	If plug and washer was removed during disassembly inspect washer. Hand start threads and torque plug 50-75 in lbs.



	<b>Install RTN if equipped</b>	If the original unit had a RTN and was removed reinstall RTN onto trunnion arm shaft. Hand start the two socket head cap screws and torque to 90 – 110 in lbs.
	<b>Install pulley, fan, lock washer and nut</b>	Place the pulley onto pump shaft.
	<b>Install fan</b>	Place the fan with the tabs pointing up onto the pump shaft.
	<b>Install four tab washer</b>	Place the four tab washer onto fan with the tabs in-between the fan tabs.
	<b>Install nut</b>	Apply Loctite™ 242 to threads of nut. Torque nut to 86 – 70 ft lbs.

	<b>Install expansion tank barb fitting</b>	Hand start the expansion tank barb fitting and torque to 200 – 240 in. lbs. Remove tape and fill with synthetic oil – 140 cc to completely fill each unit.
	<b>To insure maximum transmission performance use Parker recommended fluid listed on page 8.</b>	Fill transmission to the expansion tank fitting with 96 oz of oil.
	<b>Replace plug</b>	Hand start hollow hex plug.
	<b>Torque hollow hex plug</b>	Torque hollow hex plug to 100 – 120 in. lbs.
	<b>Finished Assembly</b>	Brake pads, hub and nut will have to be assembled after HTG has been installed on vehicle frame.



## System Maintenance Tips

- Adjust fluid level in reservoir as necessary.
- Encourage all operators to report any malfunction or accident that may have damaged the hydraulic system or component.
- Do not attempt to weld any broken HTG Transmission component. Replace any component with original Parker parts.
- Do not cold straighten, hot straighten, or bend any Torpact Transmission part.
- Prevent dirt or other foreign matter from entering the hydraulic system. Clean the area around the filler caps before checking oil level.
- Investigate and correct any external leak in the hydraulic system, no matter how minor the leak.
- Comply with Parker specifications for cleaning or replacing the filter.



**CAUTION** Do not weld, braze, solder or in any way alter any HTG Transmission component.



**CAUTION** Maximum operating pressure must not exceed recommended HTG Transmission pressure capacity.



**CAUTION** Always carefully inspect any system component that may have been struck or damaged during operation or in an accident. Replace any component that is damaged or that is questionable.



**CAUTION** Do not force any coupling onto the HTG pump coupling shaft as this could damage the unit internally.



**CAUTION** Do not mix oil types. Any mixture or any unapproved oil could deteriorate the seals. Maintain the proper fluid level in the reservoir. When changing fluid, completely drain old oil from the system. It is suggested also that you flush the system with clean oil.

Parker Pump/Motor HPM Operation extends close technical cooperation and assistance. If problems occur which you cannot solve, please contact our service department at (423) 639-8151, or your local Parker approved distributor.





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